

attached to it. This arrangement is depicted in a perspective view in FIG. 56. As shown there, the blunt cannula device 512 may be attached to the in-line injection site by inserting the blunt cannula portion into the pre-slit injection site, with the U-shaped recesses 528 receive the inlet and outlet portions 494, 496 of the in-line injection site, thus allowing the bare cannula to be inserted sufficiently far into the pre-slit injection site.

FIG. 54 shows a shield or tip protector 530 for a blunt cannula device of the type shown in FIG. 53. The tip protector 530 has a generally cylindrical outer wall 532 with raised ribs 534 for gripping. The cylindrical wall is sized to slip over the end cylindrical wall 514 of the blunt cannula device 512, and is sufficiently long to extend beyond the U-shaped recesses to completely enclose and protect the blunt cannula 518 during shipping, storing and between uses, if so desired.

Concentrically disposed within the cylindrical wall 532, the tip protector has an axially extending, hollow tube 536 for slidably receiving the blunt cannula 518 therewithin. The shield or tip protector 530 would typically be attached to the blunt cannula device 512 during manufacture, and removed when the syringe and blunt cannula device are used. If so desired, it may be reattached between uses to protect the cannula from any further contamination.

FIG. 55 is an alternative embodiment of the blunt cannula device shown in FIG. 53, and is depicted without a syringe attached to it. As shown in FIG. 55, the blunt cannula device 538 similarly has a cylindrical outer wall 540, a transverse intermediate inner wall 542, a blunt cannula 544 extending axially from the transverse intermediate wall and an entry port 546 extending in the opposite direction from the blunt cannula. The essential difference between this embodiment and the one shown in FIG. 53 is the absence of U-shaped recesses for use with an in-line injection site such as depicted in FIG. 56. For ease of attachment to an injection site, the inner surface of the cylindrical wall is preferably tapered at 548.

From the foregoing, it will be observed that numerous variations and modifications may be effected without departing from the spirit and scope of the novel concept of the invention. It is to be understood that no limitation with respect to the specific apparatus illustrated herein is intended or should be inferred. It is, of course, intended to cover by the appended claims all such modifications as fall within the scope of the claims.

What is claimed is:

1. An in-line site a fluid stream and usable with a blunt cannula device, the site comprising:

a housing defining an inlet and an outlet and a fluid flow path channel therethrough and a side channel which communicates with said fluid flow path channel;

tubing members connected to said inlet and said outlet;

a housing and resilient sealing means forming a seal for an end of said side channel, said housing including a first end defining a tapered interior surface and terminating in an annular member, wherein said tapered interior surface terminates in an annular channel formed by a ridge projecting inwardly from said interior surface, and said resilient sealing means being carried by said housing and including a generally cylindrical sealing member having a first end and a second end and being positioned in said housing first end adjacent said tapered interior surface such that a void is created by said annular channel, said sealing member having a resealable opening therein and being

axially compressed around a peripheral edge of its first end by said annular member, wherein said opening opens outwardly such that a blunt cannula can be sealingly inserted through said opening and placed in fluid flow communication with said flow channel and such that the blunt cannula can be removed therefrom with said flexible means interacting with said housing so as to reseal said resealable opening, said tapered interior surface interacting with a side peripheral surface of said sealing member so as to generate resealing radial forces, directed inwardly toward a centerline in said flow channel, to urge said resealable opening into a closed condition, and so as to deform said sealing member side peripheral surface to conform to said tapered interior surface, and wherein said flexible means contacts said ridge during insertion of the blunt cannula through said resealable opening and deforms into said annular channel; and

said first end including means, engaged with said peripheral surface, for retaining said sealing means therein.

2. The in-line injection site of claim 1 wherein prior to insertion of the blunt cannula, said resealable opening only extends part way through said sealing means.

3. The in-line injection site of claim 1 wherein said resealable opening extends entirely through said sealing means.

4. The in-line injection site of claim 1 wherein said radial resealing forces increase through said flow channel from a minimum at said dome-shaped surface.

5. The in-line injection site of claim 1 wherein a first tubing member and a second tubing member are attached to the housing.

6. The in-line injection site of claim 1 wherein the sealing member has a dome-shaped outwardly facing surface.

7. The in-line injection site of claim 1 including a locking means on said housing that cooperates with a locking means of the blunt cannula.

8. The in-line injection site of claim 7 wherein the locking means of the blunt cannula includes a pair of gripping fingers.

9. The in-line site of claim 1 wherein the site is configured as a y-site.

10. An in-line injection site usable with a blunt cannula comprising:

a housing having a first end defining an inlet to a fluid flow path, at least one channel that defines a second fluid flow path that is not parallel to the fluid flow path, said first end bounded in part by an annular lip, wherein an interior surface of the housing has a narrowing taper that terminates in an annular channel formed by a ridge projecting inwardly from the interior surface;

cylindrical resilient sealing means positioned on a selected surface of said lip, said sealing means defining a resealable cannula receiving opening therethrough, said sealing means having an exterior peripheral surface around said resealable opening and being positioned against said interior surface such that a void is created by said annular channel; and

means for retaining said sealing means adjacent said lip including force-applying means for urging said resealable opening to a sealed condition, said force-applying means including an annular retaining collar, carried by said first end, for engaging said exterior peripheral surface of said sealing means to apply axially directed forces to said sealing means so as to axially compress said sealing means around said exterior peripheral surface, wherein said resealable opening opens out-